Birt-Hogg-Dubé syndrome

Birt-Hogg-Dubé syndrome is a rare disorder that affects the skin and lungs and increases the risk of certain types of tumors. Its signs and symptoms vary among affected individuals.

Birt-Hogg-Dubé syndrome is characterized by multiple noncancerous (benign) skin tumors, particularly on the face, neck, and upper chest. These growths typically first appear in a person's twenties or thirties and become larger and more numerous over time. Affected individuals also have an increased chance of developing cysts in the lungs and an abnormal accumulation of air in the chest cavity (pneumothorax) that may result in the collapse of a lung. Additionally, Birt-Hogg-Dubé syndrome is associated with an elevated risk of developing cancerous or noncancerous kidney tumors. Other types of cancer have also been reported in affected individuals, but it is unclear whether these tumors are actually a feature of Birt-Hogg-Dubé syndrome.

Frequency

Birt-Hogg-Dubé syndrome is rare; its exact incidence is unknown. This condition has been reported in more than 400 families.

Genetic Changes

Mutations in the *FLCN* gene cause Birt-Hogg-Dubé syndrome. This gene provides instructions for making a protein called folliculin. The normal function of this protein is unknown, but researchers believe that it may act as a tumor suppressor. Tumor suppressors prevent cells from growing and dividing too rapidly or in an uncontrolled way. Mutations in the *FLCN* gene may interfere with the ability of folliculin to restrain cell growth and division, leading to uncontrolled cell growth and the formation of noncancerous and cancerous tumors. Researchers have not determined how *FLCN* mutations increase the risk of lung problems, such as pneumothorax.

Inheritance Pattern

This condition is inherited in an autosomal dominant pattern, which means one copy of the altered *FLCN* gene in each cell is sufficient to cause the disorder. In most cases, an affected person inherits the mutation from one affected parent. Less commonly, the condition results from a new mutation in the gene and occurs in people with no history of the disorder in their family.

Having a single mutated copy of the *FLCN* gene in each cell is enough to cause the skin tumors and lung problems associated with Birt-Hogg-Dubé syndrome. However, both copies of the *FLCN* gene are often mutated in the kidney tumors that occur with

this condition. One of the mutations is inherited from a parent, while the other occurs by chance in a kidney cell during a person's lifetime. These genetic changes disable both copies of the *FLCN* gene, which allows kidney cells to divide uncontrollably and form tumors.

Other Names for This Condition

- BHD
- fibrofolliculomas with trichodiscomas and acrochordons
- Hornstein-Birt-Hogg-Dubé syndrome
- Hornstein-Knickenberg syndrome

Diagnosis & Management

Genetic Testing

- Genetic Testing Registry: Multiple fibrofolliculomas
  https://www.ncbi.nlm.nih.gov/gtr/conditions/C0346010/

Other Diagnosis and Management Resources

- BHD Foundation: Practical Considerations
  https://www.bhdsyndrome.org/for-families/practical-considerations/
- GeneReview: Birt-Hogg-Dube Syndrome
  https://www.ncbi.nlm.nih.gov/books/NBK1522
- MedlinePlus Encyclopedia: Collapsed Lung
  https://medlineplus.gov/ency/article/000087.htm

General Information from MedlinePlus

- Diagnostic Tests
  https://medlineplus.gov/diagnostictests.html
- Drug Therapy
  https://medlineplus.gov/drugtherapy.html
- Genetic Counseling
  https://medlineplus.gov/geneticcounseling.html
- Palliative Care
  https://medlineplus.gov/palliativecare.html
- Surgery and Rehabilitation
  https://medlineplus.gov/surgeryandrehabilitation.html

Additional Information & Resources

MedlinePlus

- Encyclopedia: Collapsed Lung
  https://medlineplus.gov/ency/article/000087.htm
- Health Topic: Kidney Cancer
  https://medlineplus.gov/kidneycancer.html
- Health Topic: Lung Diseases
  https://medlineplus.gov/lungdiseases.html
- Health Topic: Skin Conditions
  https://medlineplus.gov/skinconditions.html

Genetic and Rare Diseases Information Center

- Birt-Hogg-Dube syndrome
  https://rarediseases.info.nih.gov/diseases/2322/birt-hogg-dube-syndrome

Additional NIH Resources

- National Cancer Institute: Kidney Cancer Home Page
  https://www.cancer.gov/types/kidney

Educational Resources

- BHD Foundation: Information Pamphlets
  https://www.bhdsyndrome.org/for-families/information-pamphlets/
- Disease InfoSearch: Multiple fibrofolliculomas
  http://www.diseaseinfosearch.org/Multiple+fibrofolliculomas/8920
- MalaCards: birt-hogg-dube syndrome
  http://www.malacards.org/card/birt_hogg_dube_syndrome
- My46 Trait Profile
  https://www.my46.org/trait-document?trait=Birt-Hogg-Dube%20syndrome&type=profile
- Orphanet: Birt-Hogg-Dubé syndrome
  http://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=122

Patient Support and Advocacy Resources

- American Cancer Society: Kidney Cancer
  https://www.cancer.org/cancer/kidney-cancer.html
- BHD Foundation
  https://www.bhdsyndrome.org/

- Kidney Cancer Association
  http://www.kidneycancer.org/
- National Organization for Rare Disorders (NORD)
  https://rarediseases.org/rare-diseases/birt-hogg-dube-syndrome/

GeneReviews

- Birt-Hogg-Dube Syndrome
  https://www.ncbi.nlm.nih.gov/books/NBK1522

ClinicalTrials.gov

- ClinicalTrials.gov
  https://clinicaltrials.gov/ct2/results?cond=%22Birt-Hogg-Dube+syndrome%22

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28birt-hogg-dubé+syndrome%5BTIAB%5D%29+OR+%28birt-hogg-dube+syndrome%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+1440+days%22%5Bdp%5D

OMIM

- BIRT-HOGG-DUBE SYNDROME
  http://omim.org/entry/135150

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